SECRET

February 13, 1958

CMCC Doc. No. 151X5.977
Copy 1 of 2
Page 1 of 1

Dear Dick:

We are forwarding herewith Progress Letter No. 16 covering work performed in connection with System No. 4 during the period extending from 1 January to 1 February 1958.

Sincerely,

Burt

Burt

Enclosures:
CMCC Doc. No. 163X5.63
Copies 1-8 of 12

SECRET

Approved For Release 2002/06/13 : CIA-RDP81B00878R000300080005-1

SECRET

Encl 1
24545
1 of 8

Progress Letter No. 16
Contract No. A-101
System 4

1 January to 1 February 1958

CMCC Document No. 163X5.63
Copy 1 of 12 Copies

(This document contains a total of 6 sheets,
including this title sheet.)

SECRET

1. General

During the period covered by this progress letter, the following work was performed:

(1) Unit environmental tests on Model 103 were completed and over-all environmental system tests were started.

(2) Corrective action was taken as required to remedy deficiencies appearing in environmental tests.

(3) Construction of Model 104 was essentially completed.

2. Environmental Testing

a. During the first week of this reporting period, environmental tests were conducted on the individual units. On the basis of these tests, all units appeared satisfactory with the exception of the Band 1 receiver which displayed frequency drift at high temperature. Since the facility to be used for environmental system tests was made available to the contractor for only a three- or four-week period starting at the end of the first week in January, the initiation of system tests appeared in order even though all of the deficiencies had not been corrected in the Band 1 receiver.

b. The entire system was moved to the system test facility on January 9, installation was completed on January 10, and tests commenced the following Monday, January 13. The system tests originally called for a cold soak at +14°F with the equipment not operative. It was found that condensation problems resulting from a cold soak of this nature caused numerous failures after the equipment was taken up to altitude and energized electrically. It was hypothesized that the condensation was occurring because of air stagnation in the various boxes. The test was accordingly modified so the equipment was operating as the temperature was lowered in

order to have the equipment blowers circulate the air. After approximately 20 minutes of operation, the equipment was shut down and the cold soak carried out for approximately one hour. The types of failure previously incurred because of the moisture then disappeared.

c. During the environmental test program the test personnel worked in two shifts. The first shift provided the count-down necessary to start an environmental test run; the second shift conducted the actual run. Several days were spent attempting to operate the equipment for sustained periods of time at a simulated altitude of 50,000 feet.

d. The 3-kv supply in the camera indicator exhibited poor voltage regulation due to temperature rise after several hours of operation. The Band 1 receiver showed a complete loss of sensitivity during such operating periods. Temperature-rise problems were explored for several days by operating the system at simulated altitudes between 40,000 and 45,000 feet. At 40,000 feet, major problems appeared to vanish with the exception of frequency drift in the Band 1 receiver.

e. After operating through January 24, during which period the majority of the system operated quite successfully for intervals of five to six hours, it was concluded that enough minor deficiencies had been observed to warrant corrective action in lieu of sustaining environmental tests. The last week of this reporting period was given to correcting these deficiencies.

f. The deficiencies observed in the process of environmental testing are listed below together with the corrective action taken.

(1) Band 1 Receiver -- The Band 1A receiver showed a complete loss of sensitivity after operating at altitude for

a short time. This had been identified as a heat problem affecting the first conversion process. In the last week of this reporting period, it was determined that both the first IF amplifier and the second local oscillator showed drift with temperature rise. The drifts were in opposite directions and were so severe cumulatively as to cause the signal to be far removed from the pass-band of the first IF amplifier. The first IF amplifier bandwidth has been broadened by staggered tuning, but no basic oscillator changes have been effected as yet. Means are being provided to cool the affected units more effectively during operation by means of an auxiliary blower and radiation fins on the units. The Band 1B receiver exhibits the same tendency although it has not shown as poor a performance as the Band 1A receiver.

(2) Band 2 Receiver -- The Band 2 receiver exhibited some tendency to generate spurious signals as its internal temperature rose with operation at altitude. It was found that these were caused by mechanical deficiencies which now appear to have been corrected.

(3) Band 3 Receiver -- Voltage-breakdown problems developed in the local oscillator of the Band 3 receiver. These had not occurred in unit tests, nor to our knowledge, in either Models 101 or 102. Corrective action was taken and the unit underwent a high-potential test for several hours with no breakdown.

(4) Camera Indicator -- The camera indicator exhibited a tendency towards intensity variation as the operating temperature rose under ambient conditions. Corrective action was taken through minor circuit redesign; future environmental tests will prove its effectiveness. During the period of minor rework, an investigation was made to

determine if the delay time in the synchroscope circuits could be improved by insertion of additional electrical delay lines. Although synchroscope action is satisfactory with laboratory test signals, the present design can fail to provide reliable synchroscope action with signals having extremely poor rise time.

(5) Programming Equipment -- Shift-register cards have exhibited a tendency to develop open joints, thus causing loss of digital information. A new board design has been effected which will minimize this occurrence. In addition, the printed circuitry has been coated with a high-dielectric, non-hygroscopic spray to minimize condensation problems. Water condensation has caused failure of these boards on several occasions.

(6) Tape Transport -- The tape transport showed a jam-roller-solenoid failure during one test run. This did not appear to be caused by any environmental conditions. No other difficulties have been observed with the tape transport.

(7) Power Supply -- Some low-voltage failures occurred during the early part of the system tests due to the condensation problems mentioned above. With the revised test procedure, no further difficulties have occurred.

3. Production

With the exception of a few subassemblies of the Band 1 receiver (which are undergoing corrective modifications), all units and subassemblies for Model 104 have been constructed. Test effort will be applied to these units as soon as manpower has been released from the environmental test program for Model 103.

4. Planning

During the next reporting interval the following work is scheduled:

(1) Completion of environmental tests on Model 103, including corrective action where necessary.

(2) Release of Model 103 to the field for flight tests. If the flight-test program is completed successfully, Model 103 will be ready for delivery before the end of February.

(3) Start of unit testing of Model 104.